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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,015	05/31/2005	Hidehiro Takemoto	273268US0PCT	8512

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EXAMINER	
WOOD, ELLEN S	

ART UNIT	PAPER NUMBER
1794	

NOTIFICATION DATE	DELIVERY MODE
12/08/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/537,015	TAKEMOTO ET AL.	
	Examiner	Art Unit	
	ELLEN S. WOOD	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *09/10/2008; 01/26/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iida et al. (US 6,190,481, hereinafter "Iida) in view of Beck (US 3,969,812).

In regards to claim 1, Iida discloses a pressure vessel that comprises a multilayer fiber reinforced outer shell that is formed from impregnated resin fiber (abstract). The fiber reinforced outer shell is heated to be hardened after the completion of winding (col. 15 lines 63-65).

In regards to claim 2, Iida discloses that the tensile breaking strain (ductility) is 1.5% or more for the reinforced fiber (col. 28 lines 48-49).

In regards to claims 5-7, Iida discloses that the outer shell comprises a layered structure (55). The first layer is a reinforced fiber that is helically (axial) wound (56). The second layer is a reinforced fiber that is hoop (circumferential) wound (56). The layers alternate between helically and hoop wound (56). The outermost layer (8e) of the pressure vessel is hoop wound (56 fig. 3).

In regards to claim 8, Iida discloses that the inner shell is made of a thin metal such as a light alloy such as aluminum alloy (22).

In regards to claim 9, Iida discloses the method of producing a pressure vessel by forming a fiber reinforced layer, which is made of a reinforced fiber imp

Iida is silent with regards to the distortion percentage of the vessel in the circumferential direction, the burst pressure compared to the charging pressure, and the strand elastic modulus.

Iida discloses that the reinforcing fibers of the outer shell are formed at a certain angle to achieve a lighter weight, and a higher strength and higher tensile modulus for maintaining a higher internal pressure (47). The layering of the reinforcing fibers and angle of the layers also prevent the pressure vessel from bursting when a hole is formed by an impact (48). Ida discloses that the pressure vessel is excellent for a CNG tank for a motor vehicle with is required to be light in weight (203). Thus, it would be obvious to one of ordinary skill in the art at the time of the invention that based on the Ida invention and what Ida discloses about the uses of the invention to design a pressure vessel with a burst pressure, which is 2.2 to 2.8 times as large as the charging pressure.

Iida discloses that the reinforced fiber are used in the fiber reinforced layer have high strength and tensile modulus such as carbon fiber yarns (35). The instant applicant uses carbon fiber yarns for the fiber reinforced layer (pg. 10). The carbon fibers used in Ida are excellent in elastic modulus, causing little fiber breaking and fluffing during winding. It would be obvious to one of ordinary skill in the art to use a carbon fiber with an elastic modulus of 250 GPa or greater to enhance the productivity and prevent the decline of strength and impact resistance of the pressure vessel.

Beck discloses a pressure vessels for storing highly pressurized fluid material, particularly to portable, lightweight pressure vessels of the type wherein a thin, lightweight metallic liner having a cylindrical portion and a pair of dome-shaped end portions is completely overwrapped by a plurality of layers of filament material (col. 1 lines 11-17). The liner material is an aluminum material (col. 4 lines 38-40). After the vessel has been overwrapped and heat cured, the sizing pressurization step is preformed (auto frettage) (col. 6 lines 42-66). The purpose of this process is to increase the pressure in the liner to a value sufficient to overcome the compression forces in the liner and to effect outward deformation of the liner with a force sufficient to rupture the strong overlap filament (col. 7 lines 1-7).

It would be obvious to one of ordinary skill in the art to combine the sizing pressurization step of Beck with the pressure vessel structure of Iida to increase the pressure of the liner to a value sufficient to overcome the compression forces in the liner.

It would have been obvious to one of ordinary skill in the art at the time the invention was made have a deformation percentage in the range that is claimed by applicant since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch,* 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Response to Arguments

3. Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

4. The 35 U.S.C 112, second paragraph, rejection of claims 1-5 and 8-9 s withdrawn.

Conclusion

5. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on January 26,2007 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELLEN S. WOOD whose telephone number is (571)270-3450. The examiner can normally be reached on M-F 730-5 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571)272-1284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1794